

34 *Mr. De La Rue, Meteors observed at Cranford,*

Time of Obs. 1866, Nov. 13. n m	Apparent Size.	Position.	Appearance, &c.	Duration.
14 38	1st mag.	{ From ζ Leonis to α Urs. Maj. }	White	
14 40	1st mag.	{ Aldebaran to a point 2° north of α Leonis }	White	
14 55	1st mag.	α Arietis to β Tauri	White	
14 57	1st mag.	θ Leonis to β Leonis	White	
15 2	= Jupiter	{ From a point 2° north of Pro- cyon to β Orionis }	White	4 sec.
15 28	1st mag.	{ Through a line bisecting at right-angles the line join- ing α Leonis and ϵ Leonis }	White	
15 30	1st mag.	From ϵ Leonis to ρ Leonis	White	
15 46	1st mag.	{ From a point 1° north of Procyon to θ Orionis }	White	

Meteors observed at Cranford, November 13th–14th, 1866.
By Warren De La Rue, Esq.

The night of the 12th–13th November was cloudy, and no observations were made. That of the 13th–14th was very brilliant during the early part of the night, and although occasionally the sky was partially obscured by thin clouds, and that a slight mist prevailed over the heavens from one o'clock to half-past three on the morning of the 14th, no interruption of the observations occurred from that cause. The wind was very high and piercingly cold,—so cold, indeed, that, although I and my two assistants were well clad, it required all our enthusiasm to prevent our discontinuing the observations. The noise produced by the rustling of the surrounding trees quite prevented any detonation from being audible, supposing such to have occurred which produced a report which would have reached the ear on a calm night. My two assistants were Mr. Reynolds and my nephew Mr. Percival James. Our place of observation was in a large archery ground, with an open horizon scarcely obstructed by surrounding objects in those directions most favourable for observations. I have often witnessed fine displays of meteors, and have seen many much more brilliant than any visible on this occasion; but I never before saw anything approaching to the grandeur of the scene presented on this occasion, especially between 1 o'clock and $1^h 20^m$ on the morning of the 14th. A few meteors were seen before 11 o'clock, and at $11^h 45^m$ the display had fairly

commenced, and gradually increased in brilliancy until about 20 minutes past 1 o'clock; after which the number of meteors gradually diminished, and at 1^h 43^m I made a note that the number was sensibly less.

With three exceptions all the meteors appeared either to emanate from the constellation *Leo*, and to shoot from this part across the heavens in divergent curves, resembling, on account of perspective, the segments of an orange, or else to converge in downward curves towards a point nearly diametrically opposite to that constellation. Facing *Leo* one could not fail to be impressed with the conviction that within that constellation was situated the radiant point; some of the meteors became visible in that group of stars as small specks of light, which rapidly increased in brilliancy and then suddenly faded out, leaving in some cases a visible vapour which lasted for several seconds. The meteors shot out from this constellation, upwards, downwards, and to the right and the left, but all evidently from one radiant centre, with the exception of the three before named, whose paths were irreconcilable with the supposition of their being connected with the system to which the grand display belonged. *Orion* and the *Great Bear* were specially favoured with brilliant shooting stars, and one which shot across *Orion* left a trail which was visible for three minutes. Many of the trails were watched through a binocular opera-glass, and were observed to curl up and gather in curvilinear knots at right angles to their path, and very gradually to fade out. One such was observed about 12^h for 2 minutes 13 seconds, and seemed to gather itself into an irregular spiral, as if acted upon by conflicting currents. The position of this trail was below the constellation *Andromeda*. Several nebulous masses of vapour were picked up through the opera-glass in the neighbourhood of the tracks of previous meteor-flights, and watched for several minutes before they disappeared completely. About one o'clock the flight of meteors apparently shooting downwards from the zenith, and from points to the north and south of the zenith through *Andromeda*, *Lacerta*, *Pegasus*, and *Cygnus*, towards the horizon diametrically opposite to *Leo*, was so continuous and brilliant, that it recalled to mind the final display of fireworks known as the *bouquet*, with this difference, that the rocket-like streams shot downwards instead of upwards. About the same period the bursts of globes of light in *Leo*, and the rocket-like meteors shooting from it, were most strikingly beautiful. I, however, consider the most brilliant display was the downward rush towards the western horizon. Many attempts were made to get the binocular opera-glass on to a meteor, but I was not quick enough to do so, although I was watching in the direction to which many came. I began at 11^h 45^m on the night of the 13th to note down the principal meteors; but as the exclamations of my assistants kept me

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informed of many brilliant meteors having escaped my observation, I gave up the attempt for a time at about half-past 12 o'clock.

The following observations were made of some of the principal meteors:—

No.	h	m	s	
1	11	45	11	A brilliant meteor from the Great Bear towards Cassiopeia, visible through a path of 35° to 40° , shining with a blue light, and leaving a trail which marked its path for several seconds.
2	11	46	0	From eastern horizon towards the Great Bear.
3	11	47	56	A bright meteor whose path could be traced for 30° from east into the constellation of the Great Bear.
4	11	48	34	A splendid meteor springing from Orion's belt towards the south in a nearly horizontal direction; path visible for 20° to 30° , shining with a blue light, and occupying about 2 ^s in its flight.
5	11	49	49	A meteor from Leo, and passing into the Great Bear between α and β about midway.
6	11	50	21	A meteor in direction parallel to β and α of the Great Bear.
7	11	51	32	From Polaris southwards.
8	11	52	0	Towards Great Bear.
9	11	53	29	Two meteors in parallel paths below α and β Orionis southwards.
10	11	54	45	From the east towards the tail of the Great Bear, disappearing just below ϵ .
11	11	56	30	From the north in a direction parallel to Mizar and η in the tail of the Great Bear.
12	11	57	8	A splendid meteor started from about 20° above the horizon, passing almost in a vertical direction to the right of β and α Ursæ Majoris. Duration of flight 2 ^s .
13	11	58	15	Another splendid meteor vertically upwards to the left of Mars, shooting past Capella.
14	11	59	7	A meteor starting from β Orionis towards the south, leaving a trail 15° in length.
15	12	0	15	Two very bright meteors about 3° apart, passing one on one side, the other on the other of Capella towards the Pleiades.
16	12	1	0	A meteor across the Pleiades.
17	12	1	10	A meteor from east passing midway between β , γ , and α , δ of the Great Bear.
18	12	2	48	A meteor followed by a second, shooting upwards on the left, and close to Mars.

h m					
12	42	Mr. Reynolds observed 16 meteors in a minute.			
12	43	"	"	28	" "
12	44	"	"	27	" "
12	45	"	"	21	" "
12	46	"	"	25	" "
12	47	"	"	24	" "
12	49	"	"	31	" "
12	52	"	"	17	" "
12	53	"	"	20	" "
12	54	"	"	22	" "
12	55	"	"	20	" "
12	56	"	"	20	" "
12	59	"	"	34	" "

Between 1 o'clock and 1.20 I noted 33, 37, 33 meteors per minute.

Mr. Reynolds at the same time, looking in an opposite direction, noted 31, 29, and 30 in the same minute, consequently about 64 meteors were noted by two observers in the same minute. I was looking towards *Leo*; Mr. Reynolds to the point diametrically opposite.

h m s				
At 1	50	0	I and Mr. Reynolds only observed together 25 meteors in the minute.	
At 2	25	0	One observer looking towards <i>Leo</i> and the other in a direction diametrically opposite, observed together only 3 meteors in a minute.	
At 2	27	0	There were observed 14 in a minute.	
3	9	0	Two observers, placed as before, observed 11 meteors in the minute.	

Observations of the Meteoric Shower of November 13-14, 1866, made at the Radcliffe Observatory, Oxford. Communicated by the Rev. R. Main.

Owing to the uncertainty of the exact time of the expected meteoric display, a strict watch was kept up during the night of Monday, Nov. 12, as well as during the whole of the following night of Nov. 13, when it actually occurred.

Up to the very time when the meteors began to appear with frequency, that is, till about 11 o'clock, the appearance of the sky was unfavourable. The afternoon was clear, but shortly before 11^h, clouds suddenly made their appearance, and it began to rain. The clouds, however, quickly disappeared, and, though they interfered occasionally with the observations, they did not prevent materially the observing of the phenomena.

Mr. Lucas began to observe a few minutes after 11^h, and